

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Original): A method for processing a substrate with plasma, comprising the steps of:

positioning the substrate in a processing chamber;

supplying a high frequency power to a substantially planar spiral antenna from a central area thereof and generating an induced electric field in the processing chamber;

generating a plasma in said processing chamber; and

shaping said induced electric field with respect to said substrate so as to achieve a uniform distribution of said plasma on said substrate.

Claim 2 (Original): The method according to claim 1, wherein:
said supplying step includes supplying the high frequency power to the spiral antenna and impedance matching an output of a high frequency power supply to an input of said spiral antenna.

Claim 3 (Original): The method according to claim 1, further comprising a step of controlling supply of the high frequency power by a controller.

Claim 4 (Original): The method according to claim 1, wherein:
said supplying step comprises,

generating an alternating magnetic field having flux lines that pass through a dielectric member disposed between said spiral antenna and said substrate in said processing chamber.

Claim 5 (Original): The method according to claim 1, wherein:
said supplying step comprises,
supplying the high frequency power to said spiral antenna which includes a plurality of curved antenna segments having inner ends which are positioned at the central area.

Claim 6 (Original): The method according to claim 5, wherein:
said supplying step comprises,
supplying the high frequency power to said curved antenna segments, each of said curved antenna segments spiraling radially outward in a same direction, said direction being either clockwise or counterclockwise.

Claim 7 (Original): The method according to claim 1, wherein:
said shaping step includes,
disposing a paramagnetic plate under said spiral antenna.

Claim 8 (New): A method for processing a substrate by a plasma processing apparatus including a processing chamber, a susceptor having a supporting area for supporting the substrate in the processing chamber, a spiral antenna having at least two elongated members, each of the members having an inner end and an outer end and outwardly extending from a central area of the processing chamber, and a dielectric member

positioned between the supporting area of the susceptor and the spiral antenna, the method comprising:

supporting the substrate in the supporting area of the susceptor;
introducing a processing gas into the processing chamber;
supplying a high frequency power to one of the inner and the outer end of each of the elongated members to generate an induced electric field in the processing chamber; and
generating a plasma in the processing chamber.

Claim 9 (New): The method according to claim 8, wherein said supplying comprises:
supplying the high frequency power to the inner end of each of the elongated members.

Claim 10 (New): The method according to claim 8, wherein said supplying comprises:
supplying the high frequency power to one of the inner end and the outer end of each of the elongated members through a matching circuit.

Claim 11 (New): The method according to claim 8, wherein the spiral antenna comprises:

a pitch of turns, the pitch varying from an inner side to an outer side of the antenna.

Claim 12 (New): A method for processing a substrate by a plasma processing apparatus, comprising
positioning the substrate in a processing chamber;

applying a high frequency power to inner end portions of a plurality of elongated members of a spiral antenna, the inner end portions of the elongated members being positioned in a central area of the spiral antenna, and the elongated members being outwardly extended from the central area in a cured shape, to generate an induced electric field in the processing chamber; and

generating a plasma in the processing chamber to process the substrate.

Claim 13 (New): The method according to claim 12, wherein said applying the high frequency power comprises:

supplying high frequency power to the inner end of each of the elongated members through a matching circuit.

Claim 14 (New): The method according to claim 12, wherein the spiral antenna comprises:

a pitch of turns, the pitch varying from an inner side to an outer side of the antenna.

Claim 15 (New): The method according to claim 12, wherein each of the elongated members of the spiral antenna is extended along a surface of the processing chamber.

Claim 16 (New): The method according to claim 15, wherein each of the elongated members has a flat elongated surface contracted with the surface of the processing chamber.